

Appendix

Claims

10. A control circuit for providing a constant power output in an electrosurgical generator, the generator having a power selection system which supplies a high voltage output to create electrosurgical energy at a pair of output electrodes, the control circuit comprising:

a current sampling circuit inductively coupled to one of the output electrodes;

a linear conversion circuit coupled to the current sampling circuit and the power selection system of the electrosurgical generator; and

a feedback correction circuit coupled to the linear conversion circuit, the power selection system and a radio frequency stage, the feedback correction circuit being adapted to receive a control voltage signal from the power selection system and a linear converted signal from the linear conversion circuit to produce a feedback control signal, the feedback control signal adapted to be supplied to the power selection system to control electrosurgical energy created at the pair of output electrodes.

11. A control circuit according to claim 10, wherein the current sampling circuit produces a signal proportional to an average current flowing through the one output electrode.

12. (Amended) A control circuit according to claim [1] 10, wherein the radio frequency stage includes a primary transformer winding, the feedback correction circuit being coupled to the primary transformer winding to adjust the amplitude of the feedback control signal.

13. A method for maintaining a generally constant output power from an electrosurgical generator having a power selection system which supplies a high voltage signal to create electrosurgical energy between two output electrodes, the method including the steps of:

inductively coupling to one output electrode;

sensing the current flowing through the output electrode;

producing a sampled current signal proportional to the average current flowing through the output electrode;

producing a linear converted signal;

providing a control voltage signal from the power selection system;

producing a feedback control signal from the control voltage signal and the linear converted signal; and

supplying the feedback control signal to the power selection system to control the amount of electrosurgical energy created.

14. A constant power control circuit for an electrosurgical generator having a power selection system and capable of functioning in one or more operational modes comprising:

a current sampling circuit coupled to an output electrode for generating a current signal;

a linear conversion circuit electrically connected to the current sampling circuit for receiving and adjusting the current signal to compensate for the operational mode of the electrosurgical generator, the linear conversion circuit generating a linear converted signal; and

a feedback correction circuit electrically connected to the linear conversion circuit for receiving the linear converted signal, the feedback correction circuit comparing the linear converted signal to a control voltage signal and generating a feedback control signal to control the amount of electrosurgical energy created.

15. The control circuit according to claim 14, wherein the feedback correction circuit includes a reducer to reduce the amplitude of the feedback control signal if a high impedance load is detected in the circuit.

16. The control circuit according to claim 15, wherein the reducer is electrically connected to a comparator which receives a high impedance reference signal from a high impedance reference generator and compares it to an output voltage to generate an impedance detection signal.

17. The control circuit according to claim 16, wherein the reducer receives the impedance detection signal and reduces the amplitude of the feedback control signal to a preset reduced voltage level signal if the output voltage is greater than the impedance detection signal to thereby protect the patient from excessive voltage levels if the impedance is high.

18. The control circuit according to claim 14, wherein the feedback correction circuit includes a generator for generating a maximum control voltage reference signal, wherein the maximum control voltage reference signal is substituted for the feedback control signal if the feedback control signal is greater in amplitude than the maximum control voltage reference signal, thereby limiting output current of the electrosurgical generator if the impedance is low

19. The control circuit according to claim 14, wherein the feedback correction circuit compares the linear converted signal to the control voltage signal by determining the difference in amplitude between the control voltage signal and the linear converted signal to produce a delta signal proportional to the difference, and subsequently adds the delta signal to the control voltage signal to produce the feedback control signal.

20. The control circuit according to claim 14, wherein the feedback correction circuit includes a generator for generating a high impedance reference signal by linearly converting the control voltage signal.

21. The control circuit according to claim 14, wherein the feedback control signal is supplied to the power selection system to control the amount of electrosurgical energy created.

22. The control circuit according to claim 14, wherein the current signal generated by the current sampling circuit is produced in proportion to the amplitude of average

current flowing through the output electrode.

23. The control circuit according to claim 14, wherein the linear converted signal is produced by multiplying the current signal by a first constant and adding a second constant to the multiplied signal.

24. The control circuit according to claim 23, wherein the first and second constants are predetermined values determined by the operational mode of the electrosurgical generator, thereby compensating for the various mode crest factors.

25. The control circuit according to claim 24, wherein the linear converted signal is directly proportional to the output RMS current of the electrosurgical generator.

26. The control circuit according to claim 24, wherein the feedback correction circuit includes a mode monitor electrically connected to the electrosurgical generator for producing an operational mode signal to identify the operational mode of the electrosurgical generator.

27. The control circuit according to claim 14, wherein the electrosurgical generator includes a radio frequency output stage.

28. The control circuit according to claim 14, wherein the linear conversion circuit is electrically connected to the power selection system so that the operational mode of the electrosurgical generator can be determined.

29. A power control circuit for an electrosurgical generator comprising means for controlling the output voltage in response to the circuit impedance load by adjusting a feedback control signal, the feedback control signal controlling the output of the electrosurgical generator, the controlling means including a correction circuit having a reducer and a comparator for comparing the amplitude of a high impedance reference signal to the output voltage, wherein the reducer reduces the amplitude of the feedback control signal to a preset reduced voltage level signal if the output voltage is greater than the amplitude of the high impedance reference signal.

30. The control circuit according to claim 29, wherein a high impedance detection signal is generated by the comparator indicative of the comparison.

31. The control circuit according to claim 30, wherein the high impedance reference signal is generated by a high impedance reference generator, the high impedance reference generator being electrically connected to receive a control voltage signal from the electrosurgical generator and linearly converting the control voltage signal.
32. A power control circuit for an electrosurgical generator comprising means for controlling the output current in response to the impedance load, the controlling means including a correction circuit having a switcher, the switcher comparing an amplitude of a feedback control signal which controls the output of the electrosurgical generator to an amplitude of a maximum control voltage reference signal and substituting the maximum control voltage reference signal if the amplitude of the feedback control signal exceeds the amplitude of the maximum control voltage reference signal to thereby limit the output current when an impedance load is at a low level.
33. The control circuit according to claim 32, wherein the maximum control reference signal is generated by a maximum control voltage reference generator electrically connected to the switcher.
34. A control circuit according to claim 33, wherein the correction circuit further comprises a reducer to reduce the feedback control signal to a preset value in response to a high impedance reference signal.
35. A control circuit according to claim 34, wherein the feedback control signal will be reduced to a preset reduced level voltage signal by the reducer if the output voltage is greater than an amplitude of the high impedance reference signal.
36. A control circuit according to claim 35, wherein a high impedance detection signal is generated by a comparator electrically connected to the reducer for comparing the amplitude of the high impedance reference signal to a voltage across a primary transformer winding within an output switching radio frequency stage of the electrosurgical generator.